March 1988 FORM: OM-1568

Effective With Style No. JJ-23

Miller®

**MODEL**

**MTTF-2512W**
**MTTF-2525W**

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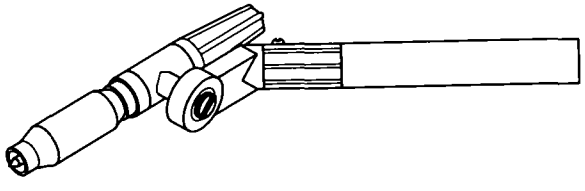


# OWNER'S MANUAL

**IMPORTANT:** **Read and understand the entire contents of this manual, with special emphasis on the safety material throughout the manual, before installing, operating, or maintaining this equipment. This unit and these instructions are for use only by persons trained and experienced in the safe operation of welding equipment. Do not allow untrained persons to install, operate, or maintain this unit. Contact your distributor if you do not fully understand these instructions.**

**Miller Electric Mfg. Co.**
A Miller Group Ltd. Company

P.O. Box 1079
Appleton, WI 54912 USA
Tel. 414-734-9821

PRINTED IN U.S.A.

ADDITIONAL COPY PRICE 35 CENTS

# LIMITED WARRANTY

**EFFECTIVE: FEBRUARY 16, 1988**

This warranty supersedes all previous MILLER warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY - Subject to the terms and conditions hereof, Miller Electric Mfg. Co., Appleton, Wisconsin warrants to its Distributor/Dealer that all new and unused Equipment furnished by Miller is free from defect in workmanship and material as of the time and place of delivery by Miller. No warranty is made by Miller with respect to engines, trade accessories or other items manufactured by others. Such engines, trade accessories and other items are sold subject to the warranties of their respective manufacturers, if any . All engines are warranted by their manufacturer for one year from date of original purchase, except Tecumseh engines which have a two year warranty.

Except as specified below, Miller's warranty does not apply to components having normal useful life of less than one (1) year, such as spot welder tips, relay and contactor points, MILLERMATIC parts that come in contact with the welding wire including nozzles and nozzle insulators where failure does not result from defect in workmanship or material.

Miller shall be required to honor warranty claims on warranted Equipment in the event of failure resulting from a defect within the following periods from the date of delivery of Equipment to the original user:

1. Arc welders, power sources, robots, and components . 1 year
2. Load banks ..... 1 year
3. Original main power rectifiers ..... 3 years (labor - 1 year only)
4. All welding guns, feeder/guns and torches ..... 90 days
5. All other Millermatic Feeders ..... 1 year
6. Replacement or repair parts, exclusive of labor .. 60 days
7. Batteries ..... 6 months

provided that Miller is notified in writing within thirty (30) days of the date of such failure.

As a matter of general policy only, Miller may honor claims submitted by the original user within the foregoing periods.

In the case of Miller's breach of warranty or any other duty with respect to the quality of any goods, the exclusive remedies therefore shall be, at Miller's option (1) repair or (2) replacement or, where authorized in writing by Miller in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized Miller service station or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at Customer's risk and expense. MILLER's option of repair or replacement will be F.O.B., Factory, at Appleton, Wisconsin, or F.O.B., at a MILLER authorized service facility, therefore, no compensation for transportation costs of any kind will be allowed. Upon receipt of notice of apparent defect or failure, Miller shall instruct the claimant on the warranty claim procedures to be followed.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR OF FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MILLER IS EXCLUDED AND DISCLAIMED BY MILLER.

EXCEPT AS EXPRESSLY PROVIDED BY MILLER IN WRITING, MILLER PRODUCTS ARE INTENDED FOR ULTIMATE PURCHASE BY COMMERCIAL/INDUSTRIAL USERS AND FOR OPERATION BY PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT AND *NOT* FOR CONSUMERS OR CONSUMER USE. MILLER'S WARRANTIES DO NOT EXTEND TO, AND NO RESELLER IS AUTHORIZED TO EXTEND MILLER'S WARRANTIES TO, ANY CONSUMER.

**WARNING: UNSAFE PROCEDURES OR PRACTICES can cause serious personal injury or death.**

- *Read, understand, and follow ALL of these safety rules before installing, operating, or servicing this equipment.*
- *Be sure that all end users of this equipment, the operator and helpers, read and understand these safety rules.*

## 1 - 1. PREVENT ELECTRIC SHOCK

Touching live electrical parts can cause severe burns to the body or fatal shock. Severity of electrical shock is determined by the path and amount of current through the body. Therefore:

a. Do not touch live electrical parts.

b. Do not work in wet or damp areas.

c. Wear dry insulating gloves and body protection.

d. Disconnect all power before installing or servicing this equipment.

e. Turn off all equipment when not in use.

f. Properly install and ground the welding power source according to its Owner's Manual and all applicable codes.

g. Do not use worn or damaged cables or cables that are too small or poorly spliced.

h. Do not wrap cables around your body.

i. Do not touch electrode and any grounded object or circuit at the same time.

j. Use only well-maintained equipment. Repair or replace damaged parts at once.

## 1 - 2. PROVIDE PROTECTION FROM FUMES AND GASES

Breathing welding fumes and gases can be hazardous to your health.

a. Keep your head out of the fumes.

b. Use adequate ventilation in the work area to keep fumes and gases from your breathing zone and the general work area.

c. If ventilation is inadequate, use an approved breathing device.

d. Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for any materials used.

## 1 - 3. PROTECT EYES AND SKIN FROM ARC RAYS; PROTECT EARS FROM NOISE

Arc rays from the welding process produce intense heat and strong ultraviolet rays that can burn eyes and skin. Noise from some processes can damage hearing.

a. Wear a welding helmet fitted with a proper filter lens (see ANSI Z49.1 for detailed information).

b. Use protective screens or barriers to protect others from flash and glare.

c. Wear protective clothing and foot protection.

d. Always wear safety glasses or safety goggles in a work area.

## 1 - 4. PREVENT FIRES AND BURNS

The hot workpiece, hot equipment, other hot metal, spatter, and arc sparks can cause fires and burns.

a. Wear correct eye, face, and body protection in the work area.

b. Allow work and equipment to cool before handling.

c. Do not weld near combustible material.

d. Watch for fire, and keep a fire extinguisher nearby.

e. For additional information, refer to NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes," available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

## 1 - 5. PROTECT COMPRESSED GAS CYLINDERS

Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

a. Protect compressed gas cylinders from excessive heat, mechanical shocks, and arcs.

b. Install and secure cylinders so that they cannot fall or tip over by fastening them to a mounting bracket, wall, or other stationary support.

c. Keep cylinders away from any welding or other electrical circuits.

d. Never allow a welding electrode to touch any cylinder.

## 1 - 6. PROVIDE PROTECTION FOR SPECIAL SITUATIONS

a. Do not weld or cut containers or materials which have held or been in contact with hazardous substances unless they are properly cleaned and inspected.

b. Do not weld or cut painted or plated parts unless special ventilation is provided to remove highly toxic fumes or gases.

c. Since welding can affect pacemakers, keep all pacemaker wearers out of the work area. Have them consult a doctor before coming near a welding operation.

## 1 - 7. PROVIDE PROPER EQUIPMENT MAINTENANCE

Improperly maintained equipment can result in poor work, but most importantly it can cause physical injury or death through fires or electrical shock. Therefore:

a. Always have qualified personnel perform the installation, troubleshooting, and maintenance work. Do not perform any electrical work unless you are fully qualified.

b. Before performing any maintenance work inside a power supply, disconnect the power supply form the electrical power source.

c. Maintain cables, grounding wire, connections, power cord, and power supply in safe working order. Do not operate any equipment in questionable condition.

d. Do not abuse any equipment or accessories. Keep equipment away from heat sources such as furnaces, wet conditions such as water puddles, oil or grease, corrosive atmospheres, and inclement weather.

e. Keep all safety devices, guards, panels, and covers in position and in good repair.

f. Use equipment for its intended purpose. Do not modify it in any manner.

## 1 - 8. ADDITIONAL SAFETY INFORMATION

For more information on safe practices for setting up and operating electric welding and cutting equipment and on good working habits, ask your welding equipment supplier. The following publications, which are available from the American Welding Society, 550 N.W. LeJuene Rd., Miami, FL 33126, are recommended to you:

a. "Safety in Welding and Cutting" - AWS Z49.1 (ANSI)

b. "Recommended Safe Practices for Gas-Shielded Arc Welding" - AWS A6.1

c. "Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping That Have Held Hazardous Substances" - AWS F4.1

d. NFPA Standard 51B, "Fire Prevention in Use of Cutting and Welding Processes," available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

e. NFPA Standard 70, "National Electrical Code," available from the National Fire Protection Association, Batterymarch Park, Quincy, MA 02269.

f. ANSI Standard Z87.1, "Safe Practice for Occupation and Educational Eye and Face Protection," available from the American National Standards Institute, 1430 Broadway, New York, NY 10018.

g. OSHA Standard 29 CFR, Part 1910, Subpart Q, "Welding, Cutting, and Brazing," available from the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

h. CSA Standard W117.2, "Code for Safety in Welding and Cutting," available from the Canadian Standards Association, 178 Rexdale Blvd., Rexdale, Ontario, Canada M9W 1R3.

i. See also the Standards Booklet Index in the welding power source Owner's Manual.

| Model | Ampere Rating at 100% Duty Cycle DCEN; ACHF | Tungsten Size Capacity | Cable Length | Torch Body | Cooling Method | Coolant Flow Rate | Weight | |
|---|---|---|---|---|---|---|---|---|
| | | | | | | | Net | Ship |
| MTTF-2512 | 250 Amperes With Argon | .020 thru 5/32 in. (0.5 thru 4.0 mm) | 12.5 ft. (3.8 m) | Length: 9.5 in. (241.0 mm) Handle Diameter: 0.75 in. (19.0 mm) Weight: 5.0 oz. (140 g) | Water | 1 qt/min (0.94 l/min) | 2 lbs. (0.9 kg) | 2 lbs. (0.9 kg) |
| MTTF-2525 | | | 25 ft. (7.6 m) | | | | 3 lbs. (1.4 kg) | 3 lbs. (1.4 kg) |

**Figure 2 - 1. Specifications**

**2 - 1. DUTY CYCLE** - The duty cycle of a welding torch is the percentage of a ten minute period that a torch can be operated at a given load. This torch is rated at 100% duty cycle using argon shielding gas. This means that the torch can be operated at rated load conditions continuously.

**CAUTION: EXCEEDING THE RATED AMPERAGE and duty cycle can result in damage to the torch.**

- *Do not exceed rated amperage and duty cycle stated in Figure 2-1.*

## 2 - 2. GENERAL INFORMATION AND SAFETY

### A. General

Information presented in this manual and on various labels, tags, and plates on the unit pertains to equipment design, installation, operation, maintenance, and troubleshooting which should be read, understood, and followed for the safe and effective use of this equipment.

### B. Safety

The installation, operation, maintenance, and troubleshooting of arc welding equipment requires practices and procedures which ensure personal safety and the safety of others. Therefore, this equipment is to be installed, operated, and maintained only by qualified persons in accordance with this manual and all applicable codes such as, but not limited to, those listed at the end of Section 1 - Safety Rules.

Safety instructions specifically pertaining to this unit appear throughout this manual highlighted by the signal words **WARNING** and **CAUTION** which identify different levels of hazard.

**WARNING** statements include installation, operation, and maintenance procedures or practices which if not carefully followed could result in serious personal injury or loss of life.

**CAUTION** statements include installation, operation, and maintenance procedures or practices which if not carefully followed could result in minor personal injury or damage to this equipment.

A third signal word, **IMPORTANT**, highlights instructions which need special emphasis to obtain the most efficient operation of this equipment.

**2 - 3. RECEIVING HANDLING** - Before installing this equipment, clean all packing material from around the unit, and carefully inspect for any damage that may have occurred during shipment. Any claims for loss or damage that may have occurred in transit must be filed by the purchaser with the carrier. A copy of the bill of lading will be furnished by the manufacturer on request if occasion to file claim arises.

When requesting information concerning this equipment, it is essential that Model Description and Style Numbers of the equipment be supplied. The style number is located on a label under the torch handle.

**2 - 4. DESCRIPTION** - This torch is specifically for use with the Gas Tungsten Arc Welding (GTAW) process. The alphanumeric model designation refers to the following:

M - Miller
T - TIG/GTAW
T - Torch
F - Flex Loc Head
25 - Ampere Rating: 250 Amperes
12 - 12.5 ft. (3.8 m) Cable
25 - 25 ft. (7.6 m) Cable
W - Water-Cooled

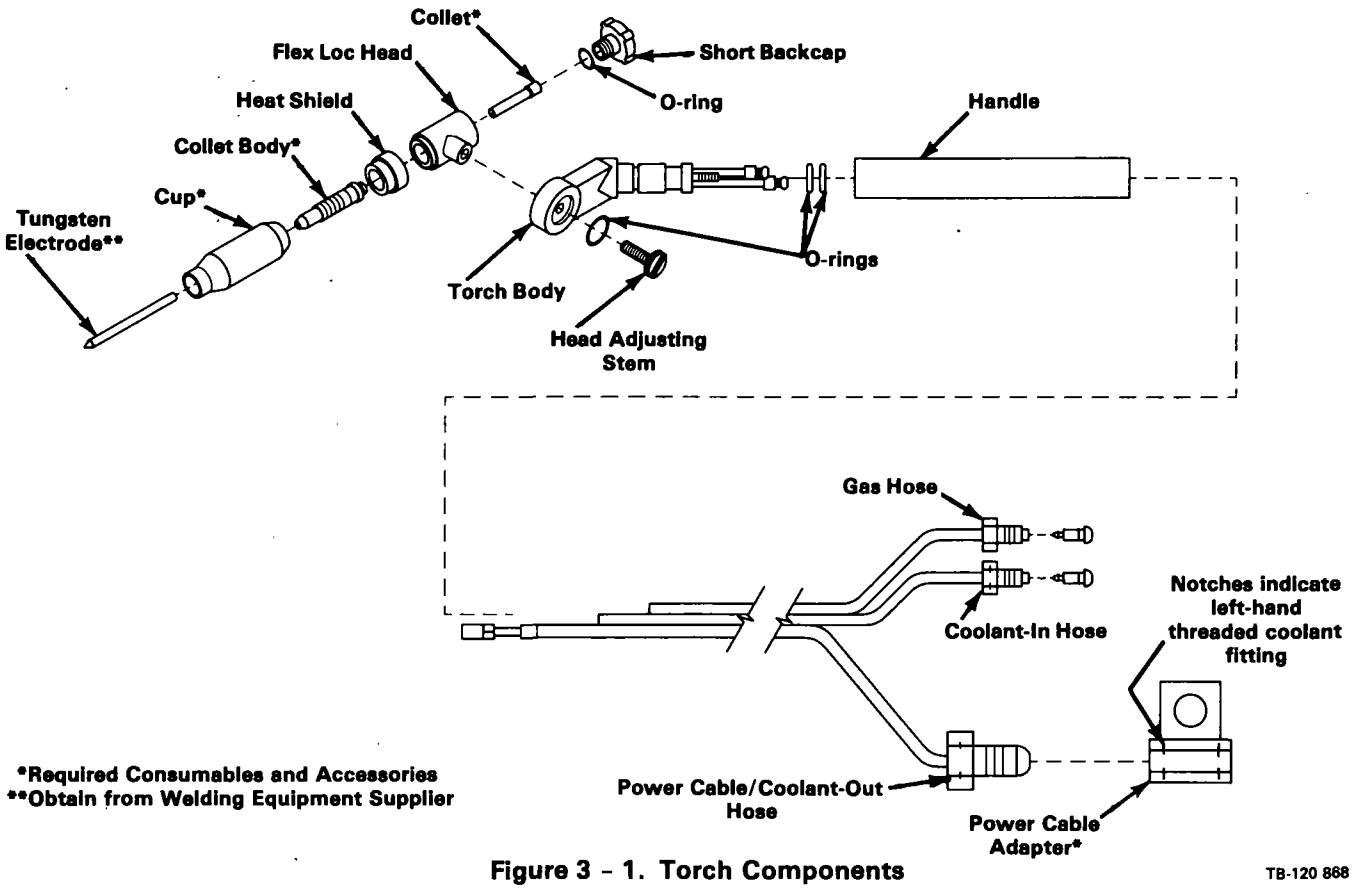



**Figure 3 - 1. Torch Components** TB-120 868

**WARNING: ELECTRIC SHOCK can kill.**

- *Do not touch live electrical parts.*
- *Shut down welding power source and disconnect input power employing "lockout/tagging procedures" before installing torch.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

## 3 - 1. TORCH BODY (Figure 3-1)

### A. Torch Body Assembly

The torch body is shipped requiring consumables and accessories indicated in Figure 3-1: cup, collet body, collet, power cable adapter and tungsten electrode. Assemble torch body as follows:

1. Install collet body into torch head making sure heat shield is in place.
2. Install cup onto collet body.
3. Remove backcap and install standard collet, slotted end first, through back of torch body into collet body. If using reverse collet, install collet with slotted end toward backcap.
4. Loosely install backcap and O-ring (supplied on backcap) onto torch head.
5. Install properly prepared tungsten electrode (see Section 5-4) through front of collet body to position electrode tip outside cup rim. Securely tighten backcap.

   To readjust electrode, loosen backcap.

**IMPORTANT:** *As a general rule, electrode extension should equal electrode diameter; but exact electrode extension may vary according to application.*

### B. Flex Loc Head Adjustment (Figures 3-1, 3-2, and 3-3)

The flex loc head can be locked in any position within its 360 degree rotation (Figure 3-1).

Adjust the flex loc head as follows:

1. Hold head adjusting stem in place, and rotate head clockwise one full turn.
2. Push head into torch body until adjusting stem turns freely.
3. Rotate head and adjusting stem simultaneously in same direction until desired angle is attained.
4. Hold adjusting stem in place, and rotate head counterclockwise until secure.

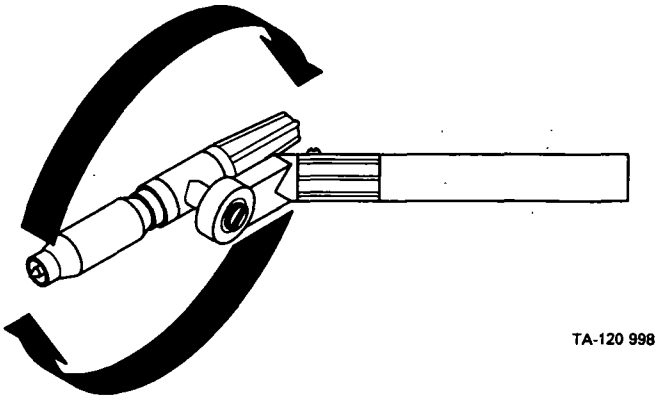



**Figure 3 - 2. Clockwise Head Adjustment**

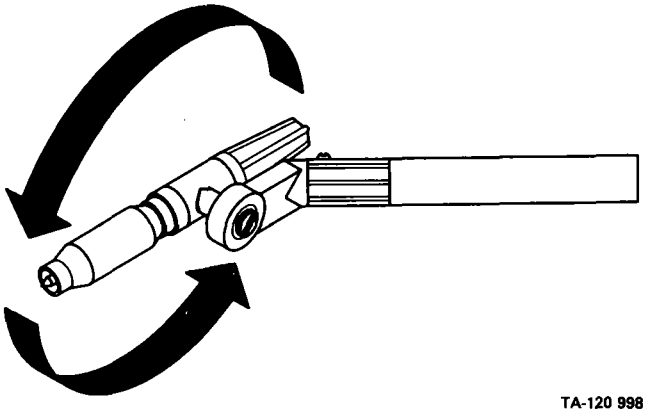



**Figure 3 - 3. Counterclockwise Head Adjustment**

### 3 - 2. COOLANT HOSES AND CONNECTIONS (Figures 3-1 and 3-4)

**CAUTION: OVERHEATING Gas Tungsten Arc Welding (GTAW) torch can damage torch.**

- *If using recirculating coolant system, do not make connections from the coolant system to water valve; instead, make connections directly from the coolant system to torch hoses.*
- *If receptacle is available on power source, connect coolant supply/pump power cord to power source receptacle.*

#### A. Coolant-In Hose

The coolant-in hose has a 5/8-18 male, notched, left-hand fitting (Figure 3-1).

To install coolant hose, connect coolant-in hose fitting to coolant supply outlet (Figure 3-4).

#### B. Power Cable/Coolant-Out Hose

The power cable/coolant-out hose has a 7/8-14 male, notched, left-hand fitting (Figure 3-1).

To install power cable/coolant-out hose, connect power cable/coolant-out fitting into power cable adapter. Connect coolant hose (extra hose not supplied) from power cable adapter to coolant return fitting (Figure 3-4).

### 3 - 3. COOLANT REQUIREMENTS

Where freezing conditions may be encountered, mix coolant according to the manufacturer's recommendations for the ambient temperature encountered.

**CAUTION: INCORRECT COOLANT LEVEL can damage coolant system and torch.**

- *Maintain correct coolant level at all times.*

This torch is rated at a 1 qt./min (0.94 l/min) coolant flow rate. Changes in flow rate may effect operating temperature of torch. Maintain proper flow rate at all times.

### 3 - 4. GAS HOSE CONNECTIONS (Figures 3-1 and 3-4)

- The gas hose has a 5/8-18 male, right-hand fitting (Figure 3-1).

To install gas hose, connect gas hose fitting to gas valve outlet. Connect gas hose (extra hose not supplied) from gas valve inlet to regulator/flowmeter (Figure 3-4).

If power source is equipped with a gas valve, use valve to control gas postflow time, or the length of time gas flows after the arc is extinguished. Insufficient gas postflow time results in an oxidized (black) electrode surface. If an oxidized electrode were used, the black surface would contaminate the weld and cause poor arc direction.

**IMPORTANT:** *As a general rule, allow 10 seconds gas postflow time per 100 amperes of weld current before closing valve.*

### 3 - 5. POWER CABLE ADAPTER CONNECTION (Figures 3-1 and 3-4)

- The power cable adapter has both a 5/8-18 and 7/8-14 female, notched, left-hand fitting (Figure 3-1).

Install power cable adapter as follows (Figure 3-4):

**WARNING: ELECTRIC SHOCK can kill.**

- *Do not touch live electrical parts.*
- *Shut down welding power source and disconnect input power employing "lockout/tagging procedures" before installing torch.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

1. Install power cable/coolant-out hose fitting into power cable adapter (see Section 3-2B).

2. Connect power cable adapter to weld output terminal.

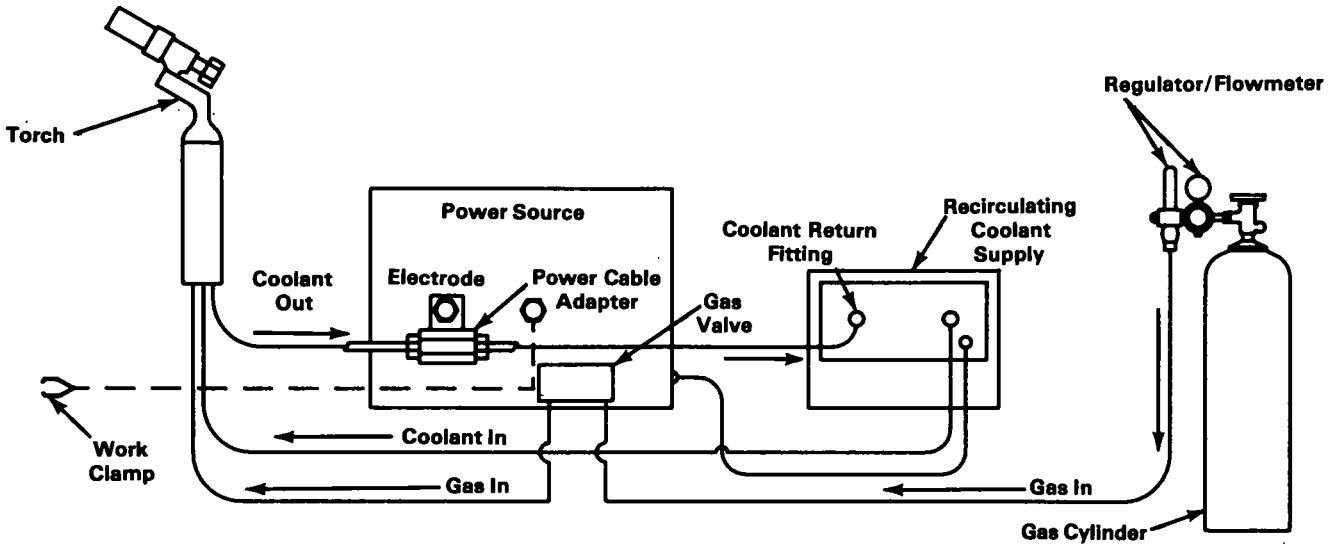



**Figure 3 - 4. GTAW Torch Connection Diagram**

## SECTION 4 - SEQUENCE OF OPERATION

**WARNING: ELECTRIC SHOCK can kill.**
- *Do not touch live electrical parts.*
- *Keep all covers and handle in place while operating.*

**ARC RAYS, SPARKS, AND HOT SURFACES can burn eyes and skin; NOISE can damage hearing.**
- *Wear correct eye, ear, and body protection.*

**FUMES AND GASES can seriously harm your health.**
- *Ventilate to keep from breathing fumes and gases.*
- *If ventilation is inadequate, use approved breathing apparatus.*

**HOT METAL, SPATTER, AND SLAG can cause fire and burns.**
- *Watch for fire.*
- *Have a fire extinquisher nearby, and know how to use.*
- *Allow work and equipment to cool before handling.*

**MAGNETIC FIELDS FROM HIGH CURRENTS can affect pacemaker operation.**
- *Wearers should consult with their doctor before going near arc welding, gouging, or spot welding operations.*

See Section 1 - Safety Rules for additional safety information.

### 4 - 1. GAS TUNGSTEN ARC WELDING (GTAW)

1. Install and connect torch according to Section 3.
2. Make sure backup and all gas connections are securely tightened.
3. Turn on coolant supply.
4. With regulator/flowmeter valve closed, open gas cylinder valve.
5. Set power source for desired welding amperage.
6. Wear dry insulating clothing and gloves and welding helmet with proper filter lens according to ANSI Z49.1.
7. Energize welding power source.
8. Set gas flow to desired level (requires open gas valve).

**IMPORTANT:** *Purge gas hose to clear hose of air, moisture, or any other contaminants. Allow gas to flow 2 to 3 minutes on new torch; 5 to 6 seconds thereafter.*

9. Begin welding.

### 4 - 2. SHUTTING DOWN

1. Stop welding.

**IMPORTANT:** *As a general rule, allow 10 seconds of gas postflow time per 100 amperes of weld current before closing valve.*

2. Turn off welding power source.
3. Turn off the shielding gas and coolant supplies at their sources.

**WARNING: HIGH CONCENTRATION OF SHIELDING GAS can harm health or kill.**
- *Shut off gas supply when not in use.*

**5 - 1. INSPECTION AND UPKEEP** - Usage and shop conditions will determine frequency and type of maintenance required. Perform inspections once a week.

**WARNING: ELECTRIC SHOCK can kill; HOT SURFACES can cause severe burns.**
- *Do not touch live electrical parts.*
- *Shut down welding power source before working on torch.*
- *Disconnect torch from welding power source before inspecting, maintaining, or servicing.*
- *Allow a cooling period before servicing.*

1. Inspect torch for broken areas, cracks and loose parts; tighten, repair and replace as required.

2. Remove grease and dirt from components, and moisture from electrical parts and cables.

**5 - 2. TORCH BODY MAINTENANCE (Figure 3-1)**

**WARNING: ELECTRIC SHOCK can kill; HOT SURFACES can cause severe burns.**
- *Do not touch live electrical parts.*
- *Shut down welding power source before working on torch.*
- *Disconnect torch from welding power source before inspecting, maintaining, or servicing.*
- *Allow a cooling period before servicing.*

Once a week inspect condition of torch body components.

Replace cup, heat shield, backcap, and O-rings if cracked. Maintain tight fit of torch components to ensure good weld quality.

**5 - 3. INSPECTING HOSES, CONNECTIONS AND CABLES**

**WARNING: ELECTRIC SHOCK can kill.**
- *Do not touch live electrical parts.*
- *Shut down welding power source and disconnect input power employing "lockout/tagging procedures" before inspecting, maintaining, or servicing.*

Lockout/tagging procedures consist of padlocking line disconnect switch in open position, removing fuses from fuse box, or shutting off and red-tagging circuit breaker or other disconnecting device.

Once a week inspect hoses and connections.

**A. Coolant-In**

Inspect coolant-in hose for breaks and clogs. Keep connections clean and tight to prevent coolant leaks.

**B. Gas**

Gas leaks may result in poor weld quality. Inspect hoses for breaks. Keep connections clean and tight.

**C. Power Cable/Coolant-Out**

Inspect cables for breaks in insulation, and ensure that all connections are clean and tight. Repair or replace cables if insulation breaks are present. Clean and tighten connections at each inspection.

**5 - 4. PREPARING TUNGSTEN ELECTRODES (Figure 5-1)**

**CAUTION: HOT FLYING METAL PARTICLES can injure personnel, start fires, and damage equipment; TUNGSTEN CONTAMINATION can lower weld quality.**
- *Shape tungsten electrode only with properly guarded grinder in a safe location wearing proper face, hand, and body protection.*
- *Do not use same wheel for any other job or the tungsten will become contaminated.*

Tungsten electrode shaping should be done on a fine grit, hard abrasive wheel. Since tungsten is harder than most grinding wheels, causing the tungsten to be chipped away rather than cut away, the grinding marks should run lengthwise with the electrode.

For additional information, see your distributor or request a handbook from factory on the Gas Tungsten Arc Welding (GTAW) process.

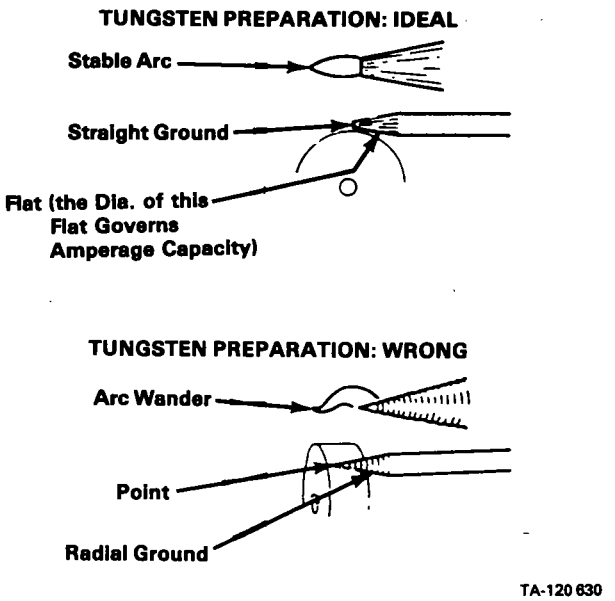



**Figure 5 - 1. Tungsten Preparation**

**Table 5 - 1. Tungsten Size Chart**

| Electrode Diameter | Amperage Range - Polarity - Gas Type | | |
|---|---|---|---|
| Pure Tungsten (Green Band) | DC-Argon Electrode Negative/ Straight Polarity | DC-Argon Electrode Positive/ Reverse Polarity | AC-Argon Using High Frequency |
| .020" | 5-20 | * | 5-20 |
| .040" | 15-80 | * | 10-60 |
| 1/16" | 70-150 | 10-20 | 50-100 |
| 3/32" | 125-225 | 15-30 | 100-160 |
| 1/8" | 225-360 | 25-40 | 150-210 |
| 5/32" | 360-450 | 40-55 | 200-275 |
| 2% Thorium Alloyed Tungsten (Red Band) | | | |
| .020" | 15-40 | * | 15-35 |
| .040" | 25-85 | * | 20-80 |
| 1/16" | 50-160 | 10-20 | 50-150 |
| 3/32" | 135-235 | 15-30 | 130-250 |
| 1/8" | 250-400 | 25-40 | 225-360 |
| 5/32" | 400-500 | 40-55 | 300-450 |
| Zirconium Alloyed Tungsten (Brown Band) | | | |
| .020" | * | * | 15-35 |
| .040" | * | * | 20-80 |
| 1/16" | * | * | 50-150 |
| 3/32" | * | * | 130-250 |
| 1/8" | * | * | 225-360 |
| 5/32" | * | * | 300-450 |

*NOT RECOMMENDED

The figures are intended as a guide, and are a composite of recommendations from American Welding Society and electrode manufacturers.

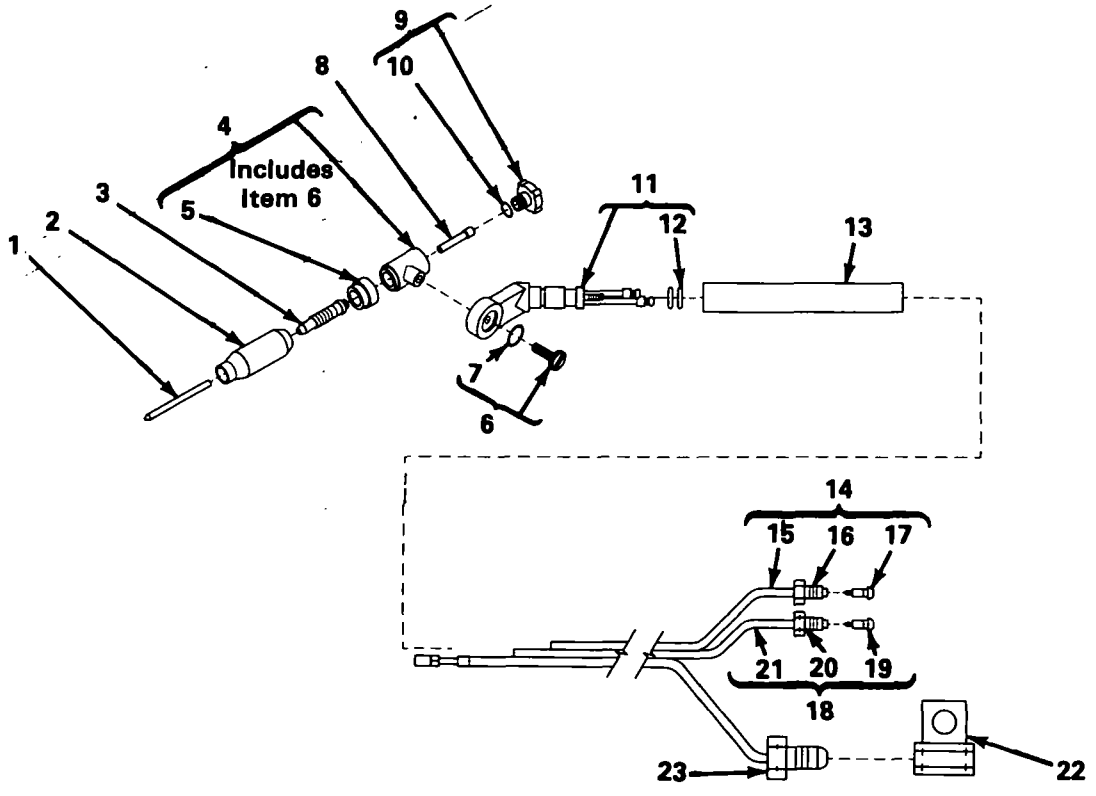


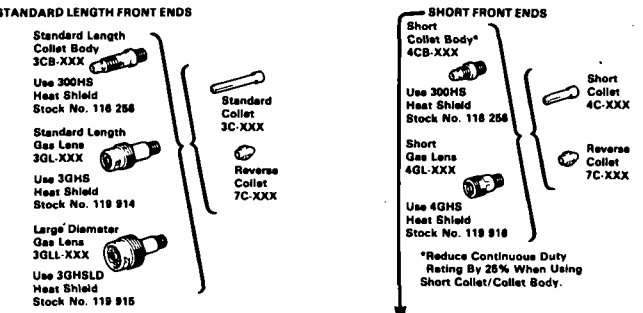

**Figure A - Complete Torch Assembly**

| Item No. | Miller Stock No. | Miller Model No. | Description | Quantity |
|---|---|---|---|---|
| **Figure A** | | | **Complete Torch Assembly** | |
| 1 | | | TUNGSTEN, electrode (consult your welding supply distributor) | |
| 2 | | | CUP (see Figure B) | |
| 3 | | | COLLET BODY (see Figure B) | |
| 4 | 118 526 | FL3L | 3 SERIES HEAD (consisting of) | 1 |
| 5 | 115 256 | 300HS | . HEAT SHIELD, std | 1 |
| 6 | 116 203 | 01-0009 | . HEAD ADJUSTMENT STEM (consisting of) | 1 |
| 7 | 116 260 | 300R | . . O-RING | 1 |
| 5 | †119 914 | 3GHS | HEAT SHIELD, small dia gas lens | 1 |
| 5 | †119 915 | 3GHSLD | HEAT SHIELD, large dia gas lens | 1 |
| 8 | | | COLLET (see Figure B) | |
| 9 | 116 259 | 300S | BACKCAP, short (consisting of) | 1 |
| 9 | †116 258 | 300M | BACKCAP, medium (consisting of) | 1 |
| 9 | †116 257 | 300L | BACKCAP, long (consisting of) | 1 |
| 10 | 116 260 | 300R | . O-RING | 1 |
| 11 | 116 204 | FLWB | FLEX LOC TORCH BODY (consisting of) | 1 |
| 12 | 116 217 | 01-0002 | . O-RING | 2 |
| 13 | 117 585 | | HANDLE | 1 |
| 14 | 116 267 | 212AH | GAS HOSE, 12-1/2 ft (consisting of) | 1 |
| 14 | 116 268 | 225AH | GAS HOSE, 25 ft (consisting of) | 1 |
| 15 | 116 512 | | . HOSE, black 1/8 ID (order by ft as req'd.) | |
| 16 | 116 266 | 2AN | . GAS NUT | 1 |
| 17 | 116 269 | 3HF | . HOSE FITTING | 1 |
| 18 | 116 232 | 212WH | WATER HOSE, 12-1/2ft (consisting of) | 1 |
| 18 | 116 233 | 225WH | WATER HOSE, 25ft (consisting of) | 1 |
| 19 | 116 269 | 3HF | . HOSE FITTING | 1 |
| 20 | 116 236 | 2WN | . WATER NUT | 1 |
| 21 | 118 512 | | . HOSE, black 1/8 ID (order by ft as req'd) | |
| 22 | †116 228 | 2PCA | POWER CABLE ADAPTER | 1 |
| 23 | 116 231 | 212PC | POWER CABLE, 12-1/2 ft | 1 |
| 23 | 116 230 | 225PC | POWER CABLE, 25 ft | 1 |

†Optional Parts
BE SURE TO PROVIDE MODEL AND STYLE NUMBER WHEN ORDERING REPLACEMENT PARTS.

## CONSUMABLE PARTS SELECTOR

**(Note: Collet, Collet Body And Gas Cup Required To Complete Torch.) Torches With High Flex Composite Cable And Water Cooled Torches Also Require A Power Cable Adapter.**


STANDARD LENGTH FRONT ENDS
Standard Length Collet Body 3CB-XXX
Use 300HS Heat Shield Stock No. 116 258
Standard Length Gas Lens 3GL-XXX
Use 3GHS Heat Shield Stock No. 119 914
Large Diameter Gas Lens 3GLL-XXX
Use 3GHSLD Heat Shield Stock No. 119 915
Standard Collet 3C-XXX
Reverse Collet 7C-XXX
SHORT FRONT ENDS
Short Collet Body* 4CB-XXX
Use 300HS Heat Shield Stock No. 116 258
Short Gas Lens 4GL-XXX
Use 4GHS Heat Shield Stock No. 119 916
Short Collet 4C-XXX
Reverse Collet 7C-XXX
*Reduce Continuous Duty Rating By 25% When Using Short Collet/Collet Body.

| Tungsten Diameter | in. (mm) | .020" (0.5) | .040" (1.0) | 1/16" (1.6) | 3/32" (2.4) | 1/8" (3.2) | 5/32" (4.0) |
|---|---|---|---|---|---|---|---|
| Amperage Range | ACHF | 5-20 | 10-80 | 50-150 | 100-235 | 150-325 | 200-425 |
| | DCSP | 5-20 | 15-80 | 70-150 | 150-250 | 220-350 | 375-500 |
| Collet (Standard) | Model No. | 3C20 | 3C40 | 3C116 | 3C332 | 3C418 | 3C532 |
| | Stock No. | 116 367 | 116 368 | 116 369 | 116 370 | 116 371 | 116 372 |
| Collet (Reverse) | Model No. | 7C20 | 7C40 | 7C116 | 7C332 | 7C418 | 7C532 |
| | Stock No. | 116 379 | 116 380 | 116 381 | 116 382 | 116 383 | 116 384 |
| Collet Body (Std. Lgth.) | Model No. | 3CB20 | 3CB40 | 3CB116 | 3CB332 | 3CB418 | 3CB532 |
| | Stock No. | 116 361 | 116 362 | 116 363 | 116 364 | 116 365 | 116 366 |

| | Stock/Model No. | | | | | | | Cup Orifice |
|---|---|---|---|---|---|---|---|---|
| Cup, Ceramic 1-27/32" Long | 116 347 (3C3) | ■ | ■ | | | | | 3/16" |
| | 116 348 (3C4) | ■ | ■ | ■ | | | | 1/4" |
| | 116 349 (3C5) | ■ | ■ | ■ | | | | 5/16" |
| | 116 350 (3C6) | | | ■ | ■ | | | 3/8" |
| | 116 351 (3C7) | | | | ■ | ■ | | 7/16" |
| | 116 352 (3C8) | | | | | ■ | ■ | 1/2" |
| | 116 353 (3C10) | | | | | ■ | ■ | 5/8" |
| | 116 354 (3C12) | | | | | ■ | ■ | 3/4" |
| Cup, Ceramic 3-7/32" Long | 116 343 (3C4L) | ■ | ■ | ■ | | | | 1/4" |
| | 116 344 (3C5L) | ■ | ■ | ■ | | | | 5/16" |
| | 116 345 (3C6L) | | | ■ | ■ | | | 3/8" |
| | 116 346 (3C7L) | | | | ■ | ■ | | 7/16" |
| Cup, Alumina 1-27/32" Long | 116 330 (3A4) | ■ | ■ | ■ | | | | 1/4" |
| | 116 331 (3A5) | ■ | ■ | ■ | | | | 5/16" |
| | 116 332 (3A6) | | | ■ | ■ | | | 3/8" |
| | 116 333 (3A7) | | | | ■ | ■ | | 7/16" |
| | 116 334 (3A8) | | | | | ■ | ■ | 1/2" |
| | 116 335 (3A10) | | | | | ■ | ■ | 5/8" |
| | 116 336 (3A12) | | | | | ■ | ■ | 3/4" |
| Gas Lens Collet Body Std. Lgth. | Model No. | 3GL20 | 3GL40 | 3GL116 | 3GL332 | 3GL418 | 3GL532 | |
| | Stock No. | 119 926 | 119 927 | 119 928 | 119 929 | 119 930 | 119 931 | |
| | Stock/Model No. | | | | | | | |
| Cup, Ceramic - Gas Lens 1-5/8" Long | 119 917 (3CG4) | ■ | ■ | ■ | | | | 1/4" |
| | 119 918 (3CG5) | ■ | ■ | ■ | | | | 5/16" |
| | 119 919 (3CG8) | | | ■ | ■ | | | 3/8" |
| | 119 920 (3CG7) | | | | ■ | ■ | | 7/16" |
| | 119 921 (3CG8) | | | | | ■ | ■ | 1/2" |
| 3CG11 is 1-1/8" Long | 119 922 (3CG11) | | | | | ■ | ■ | 11/16" |
| | 119 923 (3CG12) | | | | | ■ | ■ | 3/4" |
| | 119 924 (3CG14) | | | | | ■ | ■ | 7/8" |
| | 119 925 (3CG16) | | | | | ■ | ■ | 1" |
| Cup, Alumina - Gas Lens 1-5/8" Long | 119 932 (3AG4) | ■ | ■ | ■ | | | | 1/4" |
| | 119 933 (3AG5) | ■ | ■ | ■ | | | | 5/16" |
| | 119 934 (3AG6) | | | ■ | ■ | | | 3/8" |
| | 119 935 (3AG7) | | | | ■ | ■ | | 7/16" |
| | 119 936 (3AG8) | | | | | ■ | ■ | 1/2" |
| | 119 937 (3AG11) | | | | | ■ | ■ | 11/16" |
| Gas Lens Collet Body Lg. Dia. | Model No. | | | | 3GLL332 | 3GLL418 | 3GLL532 | |
| | Stock No. | | | | 119 902 | 119 903 | 119 904 | |
| | Stock/Model No. | | | | | | | |
| Cup, Alumina 1-7/8" Long | 119 911 (3AG8LD) | | | | ■ | ■ | ■ | 1/2" |
| | 119 912 (3AG10LD) | | | | | ■ | ■ | 5/8" |
| | 119 913 (3AG12LD) | | | | | ■ | ■ | 3/4" |

| Tungsten Diameter | in. (mm) | .020" (0.5) | .040" (1.0) | 1/16" (1.6) | 3/32" (2.4) | 1/8" (3.2) | 5/32" 4.0 |
|---|---|---|---|---|---|---|---|
| Amperage Range | ACHF | 5-20 | 10-80 | 50-150 | 100-235 | 150-325 | 200-425 |
| | DCSP | 5-20 | 15-80 | 70-150 | 150-250 | 220-350 | 375-500 |
| Collet (Short) | Model No. | 4C20 | 4C40 | 4C116 | 4C332 | 4C418 | 4C532 |
| | Stock No. | 116 373 | 116 374 | 116 375 | 116 376 | 116 377 | 116 378 |
| Collet (Reverse) | Model No. | 7C20 | 7C40 | 7C116 | 7C332 | 7C418 | 7C532 |
| | Stock No. | 116 379 | 116 380 | 116 381 | 116 382 | 116 383 | 116 384 |
| Collet Body (Short) | Model No. | 4CB20 | 4CB40 | 4CB116 | 4CB332 | 4CB418 | 4CB532 |
| | Stock No. | 116 355 | 116 356 | 116 357 | 116 358 | 116 359 | 116 360 |

| | Stock/Model No. | | | | | | | Cup Orifice |
|---|---|---|---|---|---|---|---|---|
| Cup, Ceramic 1-5/32" Long | 116 337 (2C4) | ■ | ■ | ■ | | | | 1/4" |
| | 116 338 (2C5) | ■ | ■ | ■ | | | | 5/16" |
| | 116 339 (2C6) | | | ■ | ■ | | | 3/8" |
| *1-1/8" Long | 116 340 (2C7) | | | | ■ | ■ | | 7/16" |
| | *116 341 (2C8) | | | | | ■ | ■ | 1/2" |
| | *116 342 (2C10) | | | | | ■ | ■ | 5/8" |
| Cup, Ceramic - Long 1-7/8" | 116 326 (2C3L) | ■ | ■ | | | | | 3/16" |
| | 116 327 (2C4L) | ■ | ■ | ■ | | | | 1/4" |
| | 116 328 (2C5L) | ■ | ■ | ■ | | | | 5/16" |
| | 116 329 (2C6L) | | | ■ | ■ | | | 3/8" |
| Cup, Alumina 1-5/32" Long | 116 310 (2A4) | ■ | ■ | ■ | | | | 1/4" |
| | 116 311 (2A5) | ■ | ■ | ■ | | | | 5/16" |
| | 116 312 (2A6) | | | ■ | ■ | | | 3/8" |
| | 116 313 (2A7) | | | | ■ | ■ | | 7/16" |
| | 116 314 (2A8) | | | | | ■ | ■ | 1/2" |
| | 116 315 (2A10) | | | | | ■ | ■ | 5/8" |
| Gas Lens Collet Body - Short | Model No. | 4GL20 | 4GL40 | 4GL116 | 4GL332 | 4GL418 | 4GL532 | |
| | Stock No. | 119 905 | 119 906 | 119 907 | 119 908 | 119 909 | 119 910 | |
| | Stock/Model No. | | | | | | | |
| Cup, Alumina 1" Long | 119 893 (2AG4) | ■ | ■ | ■ | | | | 1/4" |
| | 119 894 (2AG5) | ■ | ■ | ■ | | | | 5/16" |
| | 119 895 (2AG6) | | | ■ | ■ | | | 3/8" |
| | 119 896 (2AG7) | | | | ■ | ■ | ■ | 7/16" |

**SHADED AREAS INDICATE RECOMMENDED USAGE**

**Figure B - Consumable Parts And Cross Reference Chart**

## CROSS REFERENCE TO COMPETITIVE MODEL

| MILLER STOCK NO. | MILLER MODEL NO. | COMPETITIVE NO. |
|---|---|---|
| 116 367 | 3C20 | 10N21 |
| 116 368 | 3C40 | 10N22 |
| 116 369 | 3C116 | 10N23 |
| 116 370 | 3C332 | 10N24 |
| 116 371 | 3C418 | 10N25 |
| 116 372 | 3C532 | 54N20 |
| 116 379 | 7C20 | N/A |
| 116 380 | 7C40 | N/A |
| 116 381 | 7C116 | N/A |
| 116 382 | 7C332 | N/A |
| 116 383 | 7C418 | N/A |
| 116 384 | 7C532 | N/A |
| 116 361 | 3CB20 | 10N29 |
| 116 362 | 3CB40 | 10N30 |
| 116 363 | 3CB116 | 10N31 |
| 116 364 | 3CB332 | 10N32 |
| 116 365 | 3CB418 | 10N28 |
| 116 366 | 3CB532 | 406488 |
| 116 347 | 3C3 | N/A |
| 116 348 | 3C4 | 105Z43 |
| 116 349 | 3C5 | 105Z42 |
| 116 350 | 3C6 | 105Z44 |
| 116 351 | 3C7 | 105Z45 |
| 116 352 | 3C8 | 08N78 |
| 116 353 | 3C10 | 08N79 |
| 116 354 | 3C12 | 08N80 |
| 116 343 | 3C4L | 12N03 |
| 116 344 | 3C5L | 105Z60 |
| 116 345 | 3C6L | 12N02 |
| 116 346 | 3C7L | 105Z61 |
| 116 330 | 3A4 | 10N50 |
| 116 331 | 3A5 | 10N49 |
| 116 332 | 3A6 | 10N48 |
| 116 333 | 3A7 | 10N47 |
| 116 334 | 3A8 | 10N46 |
| 116 335 | 3A10 | 10N45 |
| 116 336 | 3A12 | 10N44 |
| 119 926 | 3GL20 | 45V29 |
| 119 927 | 3GL40 | 45V24 |
| 119 928 | 3GL116 | 45V25 |
| 119 929 | 3GL332 | 45V26 |
| 119 930 | 3GL418 | 45V27 |
| 119 931 | 3GL532 | 45V28 |
| 119 917 | 3CG4 | 54N35 |
| 119 918 | 3CG5 | 54N34 |
| 119 919 | 3CG6 | 54N33 |
| 119 920 | 3CG7 | 54N32 |
| 119 921 | 3CG8 | 54N31 |
| 119 922 | 3CG11 | 54N36 |
| 119 923 | 3CG12 | N/A |
| 119 924 | 3CG14 | N/A |
| 119 925 | 3CG16 | N/A |
| 119 932 | 3AG4 | 54N18 |
| 119 933 | 3AG5 | 54N17 |
| 119 934 | 3AG6 | 54N16 |
| 119 935 | 3AG7 | 54N15 |
| 119 936 | 3AG8 | 54N14 |
| 119 937 | 3AG11 | 54N19 |
| 119 902 | 3GLL332 | 45V64 |
| 119 903 | 3GLL418 | 995795 |
| 119 904 | 3GLL532 | 45V63 |
| 119 911 | 3AG8LD | 57N74 |
| 119 912 | 3AG10LD | 53N88 |
| 119 913 | 3AG12LD | 53N87 |
| 116 373 | 4C20 | N/A |
| 116 374 | 4C40 | 10N22S |
| 116 375 | 4C116 | 10N23S |
| 116 376 | 4C332 | 10N24S |
| 116 377 | 4C418 | 10N25S |
| 116 378 | 4C532 | N/A |
| 116 355 | 4CB20 | N/A |
| 116 356 | 4CB40 | 17CB20 |
| 116 357 | 4CB116 | 17CB20 |
| 116 358 | 4CB332 | 17CB20 |
| 116 359 | 4CB418 | 17CB20 |
| 116 360 | 4CB532 | N/A |
| 116 337 | 2C4 | 13N14 |
| 116 338 | 2C5 | 13N15 |
| 116 339 | 2C6 | 13N16 |
| 116 340 | 2C7 | 13N17 |
| 116 341 | 2C8 | 13N18 |
| 116 342 | 2C10 | 13N19 |
| 116 326 | 2C3L | 796F70 |
| 116 327 | 2C4L | 796F71 |
| 116 328 | 2C5L | 796F72 |
| 116 329 | 2C6L | 796F73 |
| 116 310 | 2A4 | 13N08 |
| 116 311 | 2A5 | 13N09 |
| 116 312 | 2A6 | 13N10 |
| 116 313 | 2A7 | 13N11 |
| 116 314 | 2A8 | 13N12 |
| 116 315 | 2A10 | 13N13 |
| 119 905 | 4GL20 | N/A |
| 119 906 | 4GL40 | N/A |
| 119 907 | 4GL116 | N/A |
| 119 908 | 4GL332 | N/A |
| 119 909 | 4GL418 | N/A |
| 119 910 | 4GL532 | N/A |
| 119 893 | 2AG4 | 53N58 |
| 119 894 | 2AG5 | 53N59 |
| 119 895 | 2AG6 | 53N60 |
| 119 896 | 2AG7 | 53N61 |